

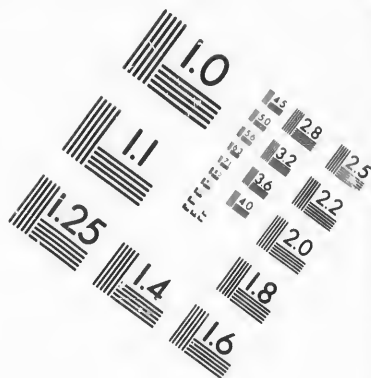
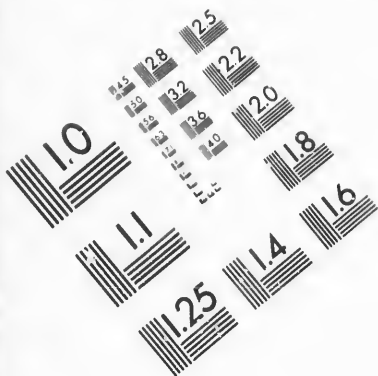
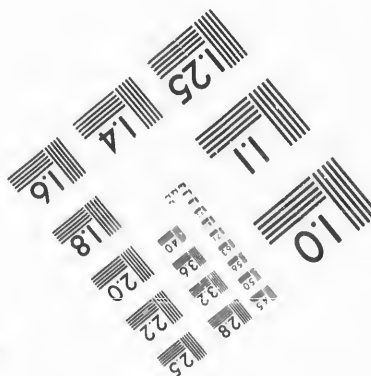
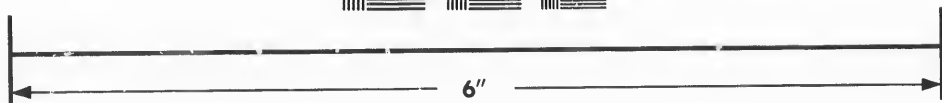
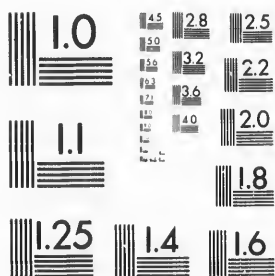


IMAGE EVALUATION TEST TARGET (MT-3)



Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

**CIHM/ICMH
Microfiche
Series.**

**CIHM/ICMH
Collection de
microfiches.**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 1987

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured covers/
Couverture de couleur
- ☐ Covers damaged/
Couverture endommagée
- ☐ Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/
Le titre de couverture manque
- ☐ Coloured maps/
Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- ☐ Bound with other material/
Relié avec d'autres documents
- ☐ Tight binding may cause shadows or distortion
along interior margin/
La reliure serrée peut causer de l'ombre ou de la
distorsion le long de la marge intérieure
- ☐ Blank leaves added during restoration may
appear within the text. Whenever possible, these
have been omitted from filming/
Il se peut que certaines pages blanches ajoutées
lors d'une restauration apparaissent dans le texte,
mais, lorsque cela était possible, ces pages n'ont
pas été filmées.
- ☐ Additional comments:/
Commentaires supplémentaires:

- ☐ Coloured pages/
Pages de couleur
- ☐ Pages damaged/
Pages endommagées
- ☐ Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- ☒ Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- ☒ Pages detached/
Pages détachées
- ☒ Showthrough/
Transparence
- ☐ Quality of print varies/
Qualité inégale de l'impression
- ☐ Includes supplementary material/
Comprend du matériel supplémentaire
- ☐ Only edition available/
Seule édition disponible
- ☐ Pages wholly or partially obscured by errata
slips, tissues, etc., have been refilmed to
ensure the best possible image/
Les pages totalement ou partiellement
obscurcies par un feuillet d'errata, une pelure,
etc., ont été filmées à nouveau de façon à
obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X		14X		18X		22X		26X		30X	
12X		16X		20X		24X		28X		32X	

The copy filmed here has been reproduced thanks to the generosity of:

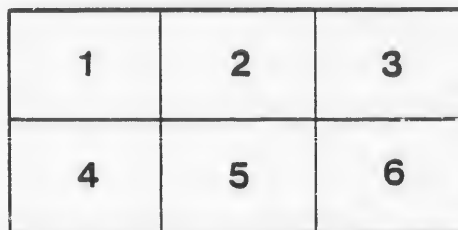
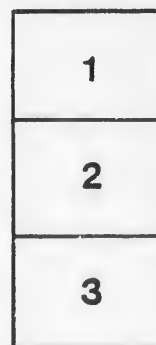
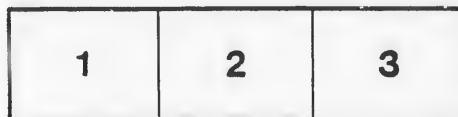
Library of Parliament and the
National Library of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche sheet contain the symbol ➡ (meaning "CONTINUED"), or the symbol ▼ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagram illustrates the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

La Bibliothèque du Parlement et la
Bibliothèque nationale du Canada

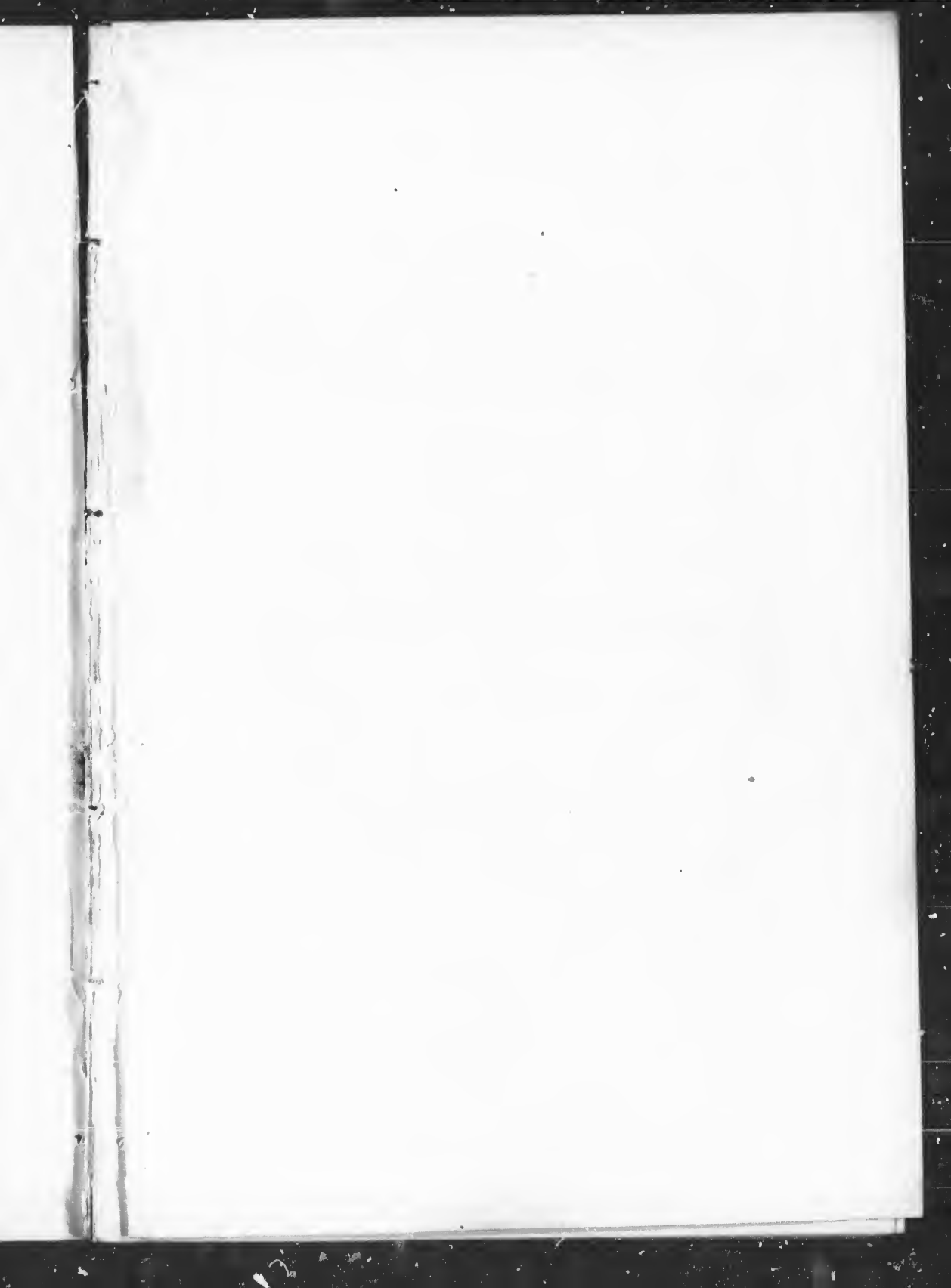
Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole ➡ signifie "À SUIVRE", le symbole ▼ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

RANGE



8
/

REPORTS

ON THE

Viger Copper Mine

CHESTER, C. E.

BY

THOS. PETHERICK, M. E.

AND

A. MICHEL,

SUPERINTENDANT OF THE MINE.



Montreal:

PRINTED BY PLINGUET & LAPLANTE, ST. GABRIEL STREET.

VIGER COPPER MINE,

(CHESTER.)

The numerous discoveries of copper-bearing rocks made, within a few years, in the Eastern Townships, have awakened, and directed the attention of speculators to that eminently metalliferous region. A system of jobbing on a large scale was in consequence speedily carried on, especially in the United States' market.

Taking advantage of the confidence created by real and valuable discoveries, parties have offered lands as metalliferous, upon which superficial works of exploration had scarcely indicated more than a few slight marks of ore, and imposition of this kind having been resorted to, it was natural that apathy and distrust should have superseded the first impulse in the public mind. The indisputable fact still remains, however, that the chain of mountains forming the greatest portion of the territory of the Eastern Townships, and which has been designated, by our learned Provincial Geologist Sir WILLIAM LOGAN, as the "Quebec Group," contains metal-bearing rocks which will, at a future day, be a source of wealth to Canada.

The property which has been called the "Viger Mine," and to which the present remarks have particular reference, is situated in that chain of moun-

tains, in the center of the Township of Chester, as will be seen by perusing the annexed reports Nos. 1 and 2.

Those two reports were mostly written at the commencement of the exploration, which consists of ten excavations, more or less considerable, and of several trenches. Subsequent operations have entirely verified the conjectures and previsions of the writers of these reports.

Report No. 1, is from Mr. PETHERICK, a distinguished Mining Engineer, from Pennsylvania, whose opinion upon such matters has the greatest authority.

Report No. 2, is from Mr. A. MICHEL, a french Miner of great practical knowledge, who superintended the works.

No. 3 is a report of progress from the same. The development given to the works, since Mr. PETHERICK's report was written, are detailed in this report, of which an extract only is published.

Being desirous of giving to their discovery such a character, as will strongly induce and attract public confidence in the future of this mine, the proprietors have thought proper not to mix up together, as has often been the case, the exploration with the working of the mine.

The ore extracted from the excavations is solely the product of the copper-bearing veins, which have been met and cut in the course of a systematic exploration, without any attempt to follow them through their development. But according to Mr. MICHEL's observations, it has been ascertained that the richness of the mine increases, as the excavations are made deeper.

It is also a fact worthy of notice, that, although the proprietors have done nothing towards the working proper of the mine, they have nevertheless directed the works so as to have them made useful at a subsequent period in view of more extensive works.

Samples of the ore may be seen at Mr. J. BARSALOU's Office, No. 49, St. François-Xavier Street, Montreal, where all informations required may be had.

Montreal, 14th November 186.

No. 1.

REPORT

ON THE

VIGER COPPER MINE,

CHESTER, CANADA EAST.

This interesting undertaking is situated on the Craig Road, in Chester Township, Arthabaska County, about 15 miles from the Arthabaska Station of the Grand Trunk Railroad. The mining explorations are on an improved lot of 250 acres (1), part of a territory of 1800 acres, the property of Mr. L. LABRECHE-VIGER, Member of Parliament.

South westerly from Mr. Labrèche's Homestead, and 590 feet from the Craig Road, ten different explorations, embracing a length of nearly 2400 feet, have been made, presenting a very satisfactory prospect for copper mining in an effective manner on the property. Those explorations I will now describe in the order in which they stand in the ascending ground southerly from the Craig Road.

EXCAVATION No. 1.—This is 590 feet southerly from the Craig Road. Here is a very strong quartz vein of very promising appearance. From lower ground, a

(1) The actual area of the Lot is not positively ascertained; but the limits are well defined.

drift has been driven towards the vein 17 feet in schistose ground of a very congenial character for productiveness of copper, in which green carbonate of copper is well diffused. This drift will strike the vein at the depth of 30 feet.

No. 2.—This excavation is 787 feet from the Craig Road. It is of little extent, but the green carbonate and copper pyrites present themselves here, where the exploration was suspended by the influx of water.

No. 3.—Is 1023 feet from the Craig Road. Green carbonate and the sulphuret were found in this opening which is quite a small one.

No. 4.—This excavation is 1260 feet from the road. At 5 feet depth the yellow sulphuret of very good quality presented itself strongly, also the green carbonate. On the lower ground, about 60 feet distant, a drift has been commenced calculated to strike this vein at about 35 feet depth, and is still being extended; the green carbonate occurs in this drift also.

No. 5.—This opening of 7 or 8 feet deep only, presents a very satisfactory appearance, the vein stuff giving a considerable quantity of the yellow sulphuret of copper, both in the schist and quartz; also the green carbonate. This opening is 1560 feet from the Craig Road.

No. 6.—This very satisfactory excavation is 1720 feet from that road, and is some hundreds of feet in height above it. This is the most effective exposure yet made, and the best. The full use of the vein has not been proved, but about 9 feet of it has been opened containing a considerable quantity of very rich sulphurets of copper, and presenting a most favorable appearance.

Four other explorations, Nos. 7, 8, 9 and 10, have been made in the same southerly direction at these distances respectively beyond No. 6 exploration; 184, 374, 644; the last No. 10 being 2904 feet from the Craig Road. These four explorations are of very insufficient extent for satisfactory development, but they all present the carbonate of copper, and copper pyrites, accompanied with "mundie" or sulphuret of iron, the congenial associate of copper in mining.

Those explorations are considered to be all on the same vein, and I consider that the prospects of it, so far as developed, are most satisfactory, and that the more attractive explorations, including No. 6, and two or more others northerly therefrom, should be vigorously pushed, in order to commence, understandingly, more permanent works, in time to get them under cover before winter.

I will now notice the prominent circumstances which occur to me, in regarding this mining undertaking, as I do, as presenting decided and important advantages.

The vein, so partially developed, as described, is a large cupreous strong course of good size,—very large where most developed,—presenting fine rich copper ore, and that in a very congenial gangue, quartz, chlorite, &c.

The rocks through which this and other veins in the property range, chloritic and other congenial schists, are of very favorable character for the productiveness of the included mineral veins, and will not be expensive for working.

That *other veins* are in the property is not ascertained, but it is known that there are others,—probably a great many. I observed two other veins very near the

one described on which the explorations were made;—strong promising veins, which I presume will be soon properly explored.

In mining in this high ground, southerly from the Craig Road, a vast extent of mineral ground can be mined without any machinery, either for pumping or hoisting the material; which is a source of vast expense in copper mining generally.

In making these observations, I have confined myself to mining matters, without expatiating on other important advantages of the property—the great abundance of useful timber—the healthiness of the district, and cheapness of labor arising from its agricultural circumstances, leaving those matters to be noticed by others locally and better informed thereon.

Respectfully submitted by

(Signed,) THO. PETHERICK,
M. E.

Sherbrooke, C. E., 30th July 1864.

(TRANSLATION.)

MESERS. J. BARSALOU & Co.,

Gentlemen,

I have the honor to report on the works I have caused to be executed from the 1st of May to the 26th July last, on the 8th Lot of the 6th Range of the Township of Chester, the result of which has been the discovery of a copper-bearing bed, which has been called the "Viger Mine."

On my arrival, during the last days of April, upon the property which I was instructed to explore, I determined after a survey of the locality to commence my operations at a distance of 800 feet East of the spot, superficially explored during the winter; that place being pointed out to me as the base of the first researches.

The cleared hill which rises above the buildings, and which slopes gently down to the Craig Road, is traversed by a series of rocky ledges all cropping out at the surface and running parallel to one another S. W. to N. E., the stratification inclining towards the West.

After a few encouraging trials, I resolved upon examining the most westward ledge, which seemed to present in case of success very satisfactory conditions for mining, owing to the inclination of the ground westwardly, with a slope sufficiently steep to admit of

the opening through the mass of the ledges of several superposed level adits, which might at a subsequent time be used for the extraction of ore and for draining.

The work, executed up to this time, extends over a distance of 2364 feet, or 13 arpents, and consist of ten excavations, one adit and one drift. The excavations are all opened on the summit of the ledge, the breadth of which, so far as ascertained, is from 20 to 35 feet. Nos. 1, 2, 4 and 5 were made simultaneously during the month of May. Nos. 3, 6, 7, 8, 9 and 10, the adit and drift were commenced in June and July.

With a view to the understanding of the following statements, and to prevent repetitions, I may remark at once that the excavations are numbered from N. to S.

Excavation No. 1 at a distance of 590 feet from the Craig Road was opened in a depression of the surface, where the ledge appears to the northward for the last time before dipping underground. The configuration of the ground rendered easily practicable the opening of a gallery, in the solid mass of the ledge, at a depth of about 30 feet from the surface.

In this work, up to this date, quartz has been found, but in small veins only. Green carbonate of copper is found in quantity, sometimes in thick layers, amongst the slates.

Excavation No. 2 is 197 feet from No. 1. This work was soon interrupted by spring water, but has offered very satisfactory indications by the presence of green carbonate both in the schist and the quartz, and more particularly by the discovery in the quartz veins of numerous and good sized nodules of purple copper.

Excavation No. 3, 236 feet from No. 2, is as yet but very superficial, being only two or three feet deep in the rock. Like No. 2 it was impeded by spring water. Here green carbonate of copper occurs in the slate, as well as traces of yellow sulphuret in the quartz.

Excavation No. 4, 237 feet from No. 3, averages six feet deep and has produced very satisfactory results in copper pyrites not only in the quartz but also in the schist which is strongly impregnated with green carbonate. A drift is already far advanced for the opening of a level adit through the ledge under this excavation at a depth of from 30 to 35 feet.

Excavation No. 5 is opened at a distance of 300 feet from No. 4. This work yields very fine and abundant quantities of copper pyrites and variegated copper. The ore is met with both in the quartz and in the slate at a depth of from 5 to 10 feet. The bottom as well as the sides of this excavation are streaked with veins of ore, and nodules are found of various sizes.

A large quantity of ore of good quality, taking into account the little work done, has already been extracted and heaped around the works.

Excavation No. 6 is close to the forest at a distance of 160 feet from No. 5. This work is in every respect, up to this moment, the most important of all. It produces magnificent and very abundant results in yellow sulphuret and variegated copper, at a depth of from 4 to 9 feet. A large quantity of rich ore, considering the depth of the work, has been extracted, part of which lies around the opening. The yellow sulphuret is distributed through chloritic and talcose schists, sometimes in veins two or three lines in thickness. Veins of pyritous and variegated copper four or five inches

thick run across the quartz, all in the same direction. The aspect of this opening is very promising.

Excavation No. 7 is in the wood, 184 feet from No. 6. The depth of this is but from 4 to 5 feet in the rock. It nevertheless yields fine specimens of copper pyrites and variegated copper. Here as in excavation No. 4 iron pyrites is abundant at the surface of the rock.

Excavations 8, 9 and 10, also in the wood, along a line extending 1050 feet from No. 7, are only as yet superficial works, undertaken for the purpose of ascertaining the continuation of the ledge which in the wood is covered with vegetable matters.

In these three excavations at a depth of from 2 to 3 feet green carbonate and nodules of purple copper were met with. In No. 9 a few traces of lead were found and the ledge seems to be continued in the best possible conditions.

To the statements of the work done up to this day, I will add that the ore is found more abundant and richer in all the excavations, where it has yet been met with, as they are more and more deepened. The last blasts have given the best results in excavations No. 5 and 6.

The 8th lot of the 6th range of the Township of Chester is traversed by the Craig road, which leads to the Arthabaska Station of the Grand-Trunk Railway, a distance of 15 miles easily and speedily travelled over.

This lot comprising more than 250 acres is for the most part cleared and used for pasture. A dwelling-house and out-houses, belonging to LOUIS LABRECHE-VIGER, the proprietor of the lot, are erected on the line of the road at a distance of a little over 300 feet from excavation No. 1. A saw-mill is constructed on a creek

half a mile from the house. The locality is sufficiently inhabited for supplying the mine with thirty or forty able-bodied laborers who begin work from 6 A. M. and finish at 6 P. M. Miners are paid from 85 to 90 cents, and laborers 80 cents a day, without board.

With regard to the results obtained, up to this day, you are, Gentlemen, enabled to judge from the specimens which have been successively despatched to you, from the examination you have made of the workings and finally from the reports of the Mining Engineers who have paid a visit to the "Viger Mine."

Mr. WM. WILLIAMS, Engineer of Sherbrooke, a Cornish miner, examined the discovery on the first of July. His report as you know is highly favorable. More recently, Captain OATEY, Senior, in whose practical experience Sir WM. LOGAN rests the greatest confidence, has declared himself very much satisfied with what he saw during his visit to this place.

In conclusion the highly encouraging report of Mr. PETHERICK, Mining Engineer of Pennsylvania, U.-S., whose opinion in the matter has the greatest weight, gives to your mining property an undoubted value, and places it amongst the most important discoveries made up to this day in Lower-Canada.

Your most respectful servant,

A. MICHEL.

"Viger Mine," }
5th August 1864. }

No. 3.

(TRANSLATION.)

TO MESSRS. J. BARSALOU & CO.,

Gentlemen,

I have the honor to report upon the work executed on your property, during the months of August, September and October.

On the resumption of the work, on the 18th August, after an interruption of 23 days, I contemplated to connect the two excavations, Nos. 5 and 6, by a drift which would have cut the mass of the rock already explored, to a depth equal to that of these two excavations. But after the removal of the soil, I perceived difficulties which would have rendered this open work very slow and consequently very expensive. I then decided upon widening the excavation No. 5 in a southern direction, so as to make it forty feet wide, sixty feet long, with a minimum depth of 25 feet at the point where the mass would be cut perpendicularly. The object of this work was to open two level adits for exploring purposes, the first running in an oblique direction, S. S. E., under the excavation No. 6, and the other nearly perpendicular to the small axis of the excavation towards the East. These level adits, divided at their opening by a space of about 25 feet, were consequently to deviate more and more as they penetrated more deeply into the mineral mass.

This work is, at this moment, nearly completed, and as early as the 15th November, the two adits will be opened if ordered. The length of the excavation No. 5 is 58 feet, by 37 feet in width at its furthest extremity, and the depth is already 17 feet; part of a mass, ten feet high, only remains to be extracted to complete the excavation.

The sloping configuration of the locality has favored the digging of a trench for the draining, as well of the excavation and its approaches, as of the contemplated level adits. This ditch, starting from the western extremity of the excavation, is 100 feet in length; its width at the bottom averages two feet and the depth is 7 feet. Its approaches have been sufficiently prepared to facilitate extensive operations during winter. No land-slip need now be apprehended, and the necessary ascents for transporting the extracted matters have been established.

The working of this excavation, from which 15,000 cubic feet of rock have already been extracted and which will probably extend to 20,000 when completed, has been productive of most fortunate discoveries. The yellow sulphuret, and sometimes the variegated copper ores have been found at different depths disseminated over the surface of the whole excavation, often in veins well defined and rich, both in the quartz and in the chloritic and talcose schists. I have extracted several tons of this copper-bearing stone from which splendid specimens have been detached. Moreover rich and abundant ore was found more particularly in the slate on a distance of 8 or 10 feet long in the ditch, where the excavation opens in it. These new discoveries give to the metal bearing rock already ascertained upon

the 8th lot, a width of 170 feet, and everything tends to inspire the confidence that the ore will be found in the contemplated level adits... ..

I took care frequently to forward to you, large and numerous specimens of the various ores obtained at different depths and spots of the large excavation. A relatively large quantity of the same ore is piled up near it, and its appearance leads to believe that it will average 30% in the vein-stone. The richness of the ore in copper has been estimated in my presence, by a competent person, at from 25 to 33 0/10.

Towards the latter end of October, you sent Mr. WILLIAMS of Sherbrooke to examine,—and report upon,—the progress realised and the actual state of the Mine. This report of which a copy has been transmitted to me must be very encouraging. I extract from it the following remarks :

“ In now speaking of the different veins that have
 “ been partially developed, I can only say, judging
 “ from each, one opinion, (as to its future results) can
 “ be formed, which is favourable for its future progress,
 “ having nearly every element for a good and lasting
 “ mine... .. the richness of the ores
 “ will very much overcome the distance of transporta-
 “ tion (15 miles)... ..
 “ In conclusion, I beg to state there are many advan-
 “ tages to be obtained and afforded by the positions
 “ of the different localities in which mines are situated.
 “ Yours is one with an adit level over that by a shaft,
 “ &c.”

P. S.—Since the above was written, and before sending it, I have made preparations for the winter works which are interesting for you to know.

The drift No. 1, which is already 18 feet deep, and where the operations were suspended on account of water, is now perfectly drained, and this inconvenience cannot be experienced hereafter.

The drift No. 4 is likewise ready for the opening of the contemplated level adit. A vein of copper glance, or vitreous copper, nine inches thick, was met in the trench; it is as yet undeveloped, but promising. The work in those drifts will be proceeded with as soon as the necessary orders shall have been given.

The level adit, leading from excavation No. 5, will be opened on the 20th of this month, with good prospects of striking the vein after a very few weeks' working. I am happy to be able to state that the ore in this excavation continues to be abundant in the schist as well as in the quartz.

The perfect confidence which I feel, that the mine will increase in richness as the searches are made deeper, has induced me to open a fourth drift, much below the level of the actual openings.

This level adit, which will be opened on the 15th instant, will run from N. O. to S. E. It will be about 35 feet below the level of excavation No. 5, and 125 feet below the summit of the hill. In its course, it will cut through the whole of the veins met with in the ditch, and in the fifth and sixth excavations. I anticipate the best results possible from this work which will not be expensive, on account of the favourable configuration of the locality, where no shaft is required, and of the veins dipping in a such a direction that a few fathoms of excavation will be sufficient to meet them and prove their productiveness.

I herewith subjoin copy of the report of an assay made by Mr. CHS. ROBB, M. E., Montreal, of the ore of "Viger Mine."

This assay, although not absolutely conclusive as to the probable productiveness of the Mine, is nevertheless very satisfactory, inasmuch as it proves the yellow sulphuret, which is the predominating ore so far, to be very rich in metallic copper.

I remain,

Your Obedt. Servt.,

A. MICHEL.

"Viger Mine," 12th Nov. 1864.

53, St. François-Xavier Street,
Montreal, 11th Nov. 1864.

L. LABRECHE-VIGER, ESQR., M. P. P.,

Dear Sir,

As you have done me the honor of consulting me with reference to the value of the copper-veins recently discovered on your property, in Chester, C. E., I beg to submit the following observations, premising that as I have not had the opportunity of visiting the locality, my remarks must be regarded as general.

In estimating the value of any metalliferous deposit, the principal data required are : the extent or length and depth, the average thickness and the average metallic contents.

In the case of your mine, the first has, I understand, been already satisfactorily proved ; the second can only be fully ascertained after much labor has been expended in sinking shafts, &c., although it may reasonably be inferred to be proportional to the linear extent of the vein on the surface.

The remaining data can only be ascertained by carefully sampling and assaying the whole of the ore-bearing part of the rock.

This process, in your case, has not yet been effected, and therefore it is impossible to give positive results.

I have however minutely inspected the specimens of the ore and rock sent to this city from time to time from the mine, and I note a decided improvement in the quality as the work has progressed.

From the last assortment of specimens sent, I have selected one which appears to be below the average richness, and have pulverised, sampled and assayed one half; the remaining half, which is an exact counterpart, I herewith return, in order that by comparison, you may form an approximate judgement in regard to all other samples.

The copper contents of this specimen, I find to be 8.30 (eight and three tenths) per cent.

From what I have seen of all the other specimens, I have no hesitation in saying that the copper contents will be full one half the above produce.

I have assayed also a prill of the pure ore (yellow sulphuret) impregnating the quartz rock, and which is evidently all of unifom quality; I find it to contain 31 (thirty-one) per cent metallic copper.

I regret being unable—from want of the requisite data—to give you more positive informations, and should recommend your measuring the amount of excavation, sampling and assaying the results, and thereby arriving at an accurate estimate.

I have the honor to be, dear Sir,

Your very respectfully,

(Signed) CHARLES ROBB,

Mining-Engineer.

